NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD

WILDLIFE UPLAND HABITAT MANAGEMENT

(Acre)

CODE 645

DEFINITION

Retaining, creating, or managing areas, other than wetland, for food and shelter for wildlife.

PURPOSE

To keep, make, or improve habitat for desired kinds of wildlife.

CONDITIONS WHERE PRACTICE APPLIES

On sites, other than wetlands, that are suitable for the kinds of wildlife food or cover plants that are needed.

SCOPE

This standard and specification describes minimum habitat requirements and management recommendations for upland wildlife. It does not contain specific habitat requirements and life history information for each wildlife species. Management information for individual species, or groups of species, may be found in the Technical Guide Reference File – Biology Section. The Service biologist or the ODNR private lands biologist can also supply specific information. Appendix I lists the contact point for the private lands biologists.

Section III of the Technical Guide provides guidance on the installation of Resource Management Systems, which may benefit the wildlife resource. The essential elements of wildlife habitat are food, cover, and water. A management plan for any species may involve land used primarily for wildlife or land where wildlife is a secondary use.

PLANNING CONSIDERATIONS FOR WATER QUANTITY AND QUALITY

Quantity

1. Effects on the water budget, especially on volumes and rates of runoff, infiltration, evaporation, transpiration, deep percolation, and ground water recharge.

2. Effects on the volume of downstream flow or aquifers that might cause undesirable environmental, social, or economic effects.

3. Potential for a change in plant growth and transpiration because of changes in the volume of soil water.

Quality

1. Effects on erosion and the movement of sediment and soluble and sediment-attached substances that would be carried by runoff.

2. Effects on the movement of dissolved substances below the root zone and to ground water.

3. Potential effects on wetlands or water related wildlife habitats.

4. Effects of pesticide and nutrient use on surface and ground water quality.

SPECIFICATIONS

1. Adequate erosion control must be maintained at all times.

2. Habitat elements for wildlife species must be present in the percentages shown in Table 1. The needed land area for each habitat element is expressed as a percentage of a specie's home range. When a habitat element is lacking for the desired species of wildlife, management measures must be taken to provide the needed habitat element. The lacking habitat element may be provided on the land area being planned or on adjoining land provided there is reasonable assurance that it will continue to provide the needed habitat. The inclusion of adjoining land must be noted on the CONS-68.

3. When "Wildlife Upland Habitat Management" 645 is the primary land use, the habitat elements listed in Table 1 must be present and one of the following species management programs must be applied:

   a. Ring-necked pheasant

      (1) Habitat Management

         (a) Nesting Cover – Retain or establish a minimum of ten acres of undisturbed grass and/or legume cover for each 160 acres. Seed mixtures listed in Appendix II are recommended. Mowing is allowed only after July 15th. Spot mowing in areas with heavy weed infestations is permissible.

         (b) Winter Cover – Retain existing shrubs, brush, wetlands, and hedgerows. At least 500 feet of field border (20 feet wide), hedgerow, pond border, fencerow, or field corners must be present (or planned) for each ten acres of nesting cover. Suitable tree and shrub species are listed in the Hedgerow and Field Border standards. Retaining and establishing winter cover adjacent to cropland and old fields will help maintain the pheasant population during the most critical time of the year.

         (c) Food – Between 80 and 120 acres of grain-producing crops are needed per the 160-acre home range of pheasants in Ohio. Sufficient food is normally present during the growing season. Fall tillage, snow, and ice reduce the availability of corn, soybeans, small grains and naturally occurring foods such as weed seeds. For landowner/operators using a Conservation Tillage system, a minimum of 30 percent residue cover left standing (untilled and ungrazed) over winter will be adequate.

            For fall plowed or other tilled croplands, wildlife food patches, adjacent to good cover, should be planted at a ratio of 2,000 square feet of food patch per 40 acres to provide a winter food supply. The following mixture is recommended:

Seed	Rate per 1,000 sq. ft.
Soybeans	4 ounces
Corn	4 ounces
Dwarf sorghum	4 ounces
Proso or browntop millet	2 ounces
Sunflowers	2 ounces
Buckwheat	2 ounces
Lespedeza(s)	1 ounce

Several small food patches will be more effective than one large one. A maximum size of ¼ acre will result in greater utilization and more habitat diversity. Leaving two rows of corn unharvested next to good cover is also recommended.

b. Bobwhite quail and cottontail rabbit

(1) Habitat Management

(a) Nesting cover – prime nesting habitat for these species consists of scattered shrubs and briers interspersed with a moderately dense stand of herbaceous vegetation (grasses and forbs). Bobwhites prefer to build their grass-roofed nest in open herbaceous cover less than 20 inches tall. Maintaining old fields in the 5-10 year successional stage (characterized by scattered shrubs, briers, goldenrod, grasses, broomsedge, etc.) by cutting young trees or bushhogging is recommended. Similar vegetative habitat can be found along hedgerows, fencerows, woodland edges, windbreaks and in odd areas. These areas are especially valuable if they occur adjacent to fallow fields. Delayed mowing of these areas until after August 15 is also required when the primary land use is wildlife management. A minimum of 2 acres of nesting cover per 40 acres is necessary for these species. This acreage can be old field habitat or strips of habitat along hedgerows, fencerows, etc. In addition, each cropfield must have at least one edge maintained in shrubs and grass. This area should be at least 20 feet wide (see Field Border standard).

(b) Winter cover – retain or establish at least 1 acre of winter cover per forty acres (also functions as escape and/or protective cover). These areas will protect quail and rabbits from severe winter storms. This cover can be provided in dense brush piles, evergreen hedgerows, and dense thickets of briers. Woodland borders can also provide winter cover. They should be improved by harvesting or cutting the larger trees (use cull logs for brushpile construction) and allowing shrubs to develop. A 40-foot wide woodland edge will provide winter and escape cover and increase woodland production. Areas of dense cover should be located as close to food sources as possible since quail and rabbits only move as far from protective cover as needed to obtain adequate food.

(c) Food

Bobwhite quail prefer seeds of wild forbs and cultivated grains during most of the year. The insect portion of the adult diet is not significant except during egg laying (up to 30%). Chicks feed heavily on insects and other invertebrates for the first few weeks after hatching. Plant lespedezas (common, Korean, sericea, shrub) in odd areas and along woodland edges. See discussion of food plots under ring-necked pheasant for additional information. For cooperators using a **Conservation Tillage** system, a minimum of 30 percent residue cover left standing (untilled and ungrazed) over winter will be adequate.

c. Ruffed grouse, gray squirrel and wild turkey

(1) Habitat Management

(a) Cover – mature deciduous and second growth woodlands consisting of mixed hardwoods are necessary for these species. Special emphasis must be placed on managing the woodland to provide (1) conifers or recently cutover hardwoods for winter cover, (2) hardwoods for nesting and winter food, (3) brushy areas for summer and fall food, and (4) open areas for edge cover.

For ruffed grouse, small clear-cuttings, ¼ to 1 acre per 10 acres of woodland, will be made on a rotation schedule. Aspen, beech, hophornbean, crabapple, cherry, birch, mast-producing trees and shrubs (oak, hickory, etc.) should not be harvested. Greenbrier and honeysuckle thickets should be maintained by removing larger trees and promoting the growth of small trees and shrubs.

Three or four den trees per acre should be maintained for maximum squirrel protection. In young stands of mast producing trees, den boxes will be erected at a rate of 2-3 per acre. Grapevines are heavily used by gray squirrels. They anchor leaf nests and provide food. Two or more per acre will be maintained, preferably on low value or cull trees.

Wild turkeys require extensive areas of woodland and can be found in only one-third of Ohio's counties. With good interspersion of habitat types, hardwood openings, and conifers, turkeys may restrict their daily movement to 400-1000 acres. Openings such as small woodland clearcuts, woodland roads, cultivated fields, and pastures should cover 10-25% of the area. One or two acres for every 100 acres of woodland are necessary. Clearings planted to grasses, clovers, or trefoil should be mowed after August 1.

Livestock must be excluded from woodlands to provide the needed shrubby and herbaceous habitat. The **Livestock Exclusion** standard should be consulted for more information.

(b) Food

Ruffed grouse—manage woodland to provide aspen, greenbrier, honeysuckle, sumac, dogwoods, wild grape, plums, cherries, hophornbean, hawthorns and mast producing trees and shrubs. (See clear-cutting requirements above).

Gray squirrel-manage woodland to favor hickory, oak, elm, beech, maple and other seed producing trees and shrubs.

Wild turkey—manage to favor oaks and other mast producing trees. Plant food plots near woodland edges. See food plot discussion under ring-necked pheasant for additional information.

d. White-tailed deer and fox squirrel

(1) Habitat Management

(a) Cover – different-aged timber stands and diverse food and cover are ideal for these species. Mixed forestland, mature open hardwood woodlots, brushland, and dense stands of saplings interspersed with farmland will provide the needed habitat components. Emphasis should be placed on managing woodlands to favor mast-producing tees such as hickory, oak, and beech.

Both fox squirrels and white-tailed deer have small home ranges, about 40 acres and 2-3 square miles, respectively. Fox squirrels are more abundant (than gray squirrels) in western and northeastern Ohio where small woodlots surrounded by cropfields are common. The more heavily forested areas of the hill country also provide fox squirrel habitat, but to a lesser extent. White-tailed deer are more abundant in eastern and extreme northwestern Ohio. Populations in the western counties are considered low by comparison, but huntable numbers are present. All of Ohio's 88 counties reported deer harvested in 1982.

White-tailed deer and fox squirrels require brushy fencerows, field borders, woodland edges, and riparian vegetation for concealment when moving between their preferred habitat types. These travel lanes are especially important in areas where farm fields border on woodland because wheat grain and standing crops are important dietary components for both species. To provide the needed travel lanes every cropfield must have at least one edge maintained in shrubs and grass. Standards and specifications for **Field Border, Hedgerow or Field Windbreak** must be satisfied. Dogwoods, crabapple, Japanese honeysuckle, Northern white cedar, and sumacs are some recommended species if planting additional cover is necessary.

White-tailed deer do best in areas providing different-aged timber stands. Small clearcuts (1-2.5 acres) will be made in mature woodlands at a 3-5 percent rate. This will encourage the growth of "browse"—shrubs, forbs, and young saplings. Cutting small (less than 10 inches dbh) maples and birches during the winter months will induce sprouting and provide additional food. Access roads and firebreaks are good ways of providing openings in extensively wooded areas. To protect the shrubby and herbaceous understory livestock **must** be excluded from the woodland. Standards for access roads, firebreaks, and livestock exclusion should be consulted for more information and minimum requirements.

Fox squirrel density in Ohio is usually two per acre. For maximum squirrel production 3-4 den trees per acre will be maintained. In woodlands where squirrel management is secondary to timber production, a minimum of two den trees per acre will be maintained. Grapevines anchor leaf nests and provide food. Two or three per acre are needed, preferably on cull trees. Management of a woodlot should favor mast-producing species, especially hickories.

White-tailed deer - manage habitat to provide a variety of shrubs, saplings, other browse, mast, herbaceous vegetation, and agricultural crops. Small clear-cuts (1-2.5 acres) at a 3-5% rate and food plots (in non-row crop regions) will usually provide sufficeint food. Thirty percent residue cover left standing (untilled and ungrazed) over winter will be adequate for cooperators using a conservation tillage system. Two rows of unharvested corn will provide additional food.

Fox and squirrel - manage woodlands to favor hickory, oak, beech, maple, and other seed producing trees and shrubs. Maintain at least 35 mast trees 14 inches dbh or larger per acre.

e. General Wildlife

(1) Habitat Management

Where non-specific wildlife management is the landowner's goal, the available habitat should be managed for a diversity of vegetation and successional stages. The following practices are applicable:

(a) Retain or establish grass/legume cover, hedgerows, windbreaks, and field borders in accordance with the corresponding standard and specification.

(b) Protect marshes, ponds, woodlands, streambanks, and odd areas from livestock.

(c) Delay mowing of roadsides, streambanks and ditches until after August 15.

(d) Plant food patches in odd-areas—see mixture under ring-necked pheasant discussion.

(e) Maintain woodland openings and roads by bushhogging, disking, cutting or burning to provide a variety of successional vegetation.

(f) Leave den trees at the recommended rates when performing timber stand improvement. Do not remove snags or other cull trees that provide food and nesting cavities.

4. When Wildlife Upland Habitat Management (645) is the secondary land use, the habitat elements listed in table 1 must be present and one of the following management programs must be applied:

a. Cropland – Wildlife Land

Existing herbaceous field borders and grassed waterways mowed only after August 15; existing brushy cover in fencerows and waterways is retained; and grain crop residues (does not include soybeans) left standing over winter. If crop residues are not available, food plots will be established at a rate of 2,000 square feet per 40 acres. See ring-necked pheasant section for seed mixture. Two rows of unharvested corn may be substituted for the food plot.

b. Woodland-Wildlife Land

(1) Meets minimum standards and specifications for **Livestock Exclusion.**

(2) A minimum of three mast producing trees (oak, hickory, or beech larger than 14 inches dbh) per acre retained during a harvest cut or timber stand improvement operation.

(3) A minimum of two den trees per acre is retained during a harvest cut or timber stand improvement operation. The den trees may be the same trees retained under the previous item.

(4) Woodland borders will be 40 feet or wider. This can be accomplished by planting shrub rows along existing woodland or by removing or harvesting larger trees along the perimeter. Using medium size trees as living brushpiles is also recommended.

c. Hayland – Wildlife Land

Meets minimum standards and specifications for Pasture and Hayland Management (510) and leaves strips 30 feet or more in width unmowed on at least two sides of the field. Periodic mowing to prevent woody succession should be scheduled every three to five years.

d. Pastureland – Wildlife Land

Meets minimum standards and specifications for Pasture and Hayland Management (510) but grazing is limited to a minimum of 5 inches (bluegrass) or 6 inches (other grasses).

Table 1. Habitat Elements for Selected Wildlife Species in Ohio

Species	Home Range (Ac.)	%Crops[1]	% Herbaceous[2]	% Woody	% Odd Areas[4]
Ring-necked pheasant	160	50-80	10-40	5- 10	5-45
Bobwhite quail	40	30-55	15-40	15- 30	15-30
Cottontail rabbit	5	0-15	35-50	35- 50	15-35
Ruffed grouse	40	0- 5	0-15	80-100	0-30
Gray squirrel	15	0- 5	0- 5	85-100	0- 5
Wild turkey	400-1000	0- 5	10-20	75-100	0-20
White-tailed deer	160	0-25	20-40	35- 80	5-25
Fox squirrel	40	30-50	0- 5	20- 40	10-30
General wildlife	--	5-15	10-50	35- 85	10-30

1. Crops – grain producing plants such as corn, soybeans, wheat, rye, oats, etc.
2. Herbaceous – pastureland, hayland, meadows, idleland (old fields); grasses and legumes
3. Woody – woodland and brushland – areas with trees, shrubs and vines.
4. Odd areas – windbreaks, waterways, hedgerows, fencerows, and other areas of permanent herbaceous or woody cover.

REFERENCES

American Wildlife and Plants – A Guide to Wildlife Food Habits.
Martin, A. C., Zim, H. S. and A. L. Nelson. Dover Publications, Inc., New York, 1961. 500 pp.

Bobwhite Quail Management in Ohio. Publication 314 (R279), Ohio Department of Natural Resources

Building Brushpiles for Wildlife. OH-CONS-C-35, U.S. Soil Conservation Service.

Cottontail Rabbit Management in Ohio. Publication 190, Ohio Department of Natural Resources.

Eastern Fox Squirrel in Ohio. Publication 119 (R778), Ohio Department of Natural Resources.

Eastern Gray Squirrel in Ohio. Publication 95 (R778), Ohio Department of Natural Resources.

Foods of Ruffed Grouse in Ohio. Ohio Fish and Wildlife Report 7, November 1980, Ohio Department of Natural Resources

Land Management for Bobwhite Quail. OH-CONS-C-38, U.S. Soil Conservation Service.

Land Management for Cottontail Rabbits. OH-CONS-C-39, U.S. Soil Conservation Service.

Land Management for Ring-necked Pheasants. OH-CONS-C-37, U.S. Soil Conservation Service.

Land Management for Tree Squirrels. OH-CONS-C-40, U.S. Soil Conservation Service.

Land Management for White-tailed Deer. OH-CONS-C-46, U.S. Soil Conservation Service.

Land Management for Wild Turkey. OH-CONS-C-44, U.S. Soil Conservation Service.

Northern Bobwhite Quail Habitat Management Guidelines. In service Document 64 (R284), Ohio Department of Natural Resources.

Prairie Whitetails. Calhoun, J. and F. Loomis. Illinois Department of Conservation.

Ruffed Grouse in Ohio. Publication 98 (R768), Ohio Department of Natural Resources.

Sportsman Pheasant Program. Publication 3 (179), Ohio Department of Natural Resources.

Squirrel Hunting in Illinois. Nixon, C. M., Havera, S. P., and J. A. Ellis. January 1978, Illinois Department of Conservation.

Wildlife Food Patch Seed Mixture. Publication 351 (R980), Ohio Department of Natural Resources.

Wildlife Upland Habitat Management – Standard and Specification (Wisconsin 1979; Iowa 1981; and Missouri 1982). U.S. Soil Conservation Service.

SITE ADAPTATION

Seeding Mixtures	Rate Lbs./Acre		Well Drained Low-Medium Productivity Nearly Level To Steep, Stony or Steep & Very Steep Slopes	Well Drained High Productivity	Well and Moderately Well Drained Low-Medium Productivity Nearly Level to Moderately Steep	I
			P&H Suit. Group – A3, A4, B2, E2, F2, F4, F6 G2	P&H Suit. Group - A1, A2,	P&H Suit. Group – B1, B4 E1, E3, F1, F3, F5, G1	
Alfalfa	12-15			X	X	
Alfalfa & Timothy or Smooth Bromegrass Or Orchardgrass	10 2 - 4 6 4			X	X	
Alfalfa & Red Clover & Timothy or Smooth Bromegrass Or Orchardgrass	7 3 2 – 4 6 4			X	X	
Red Clover & Alsike or Ladino Clover & Timothy or Smooth Bromegrass Or Orchardgrass	6 2 ¼ 2 – 4 6 4			X	X	

1/ Pure stands of alfalfa will usually not remain for the life of a CRP contract and are not allowed for a CP-4 Practice.

SITE ADAPTATION

Seeding Mixtures	Rate Lbs./Acre		Well Drained Low-Medium Productivity Nearly Level To Steep, Stony or Steep & Very Steep Slopes P&H Suit. Group – A3, A4, B2, E2, F2, F4, F6, G2	Well Drained High Productivity P&H Suit. Group - A1, A2	Well and Moderately Well Drained Low-Medium Productivity Nearly Level to Moderately Steep P&H Suit. Group – B1, B4 E1, E3, F1 F3, F5, G1	I
Birdsfoot Trefoil 1/ & Timothy or Orchardgrass	6 4 4			X	X	
Orchardgrass	6 – 8		X	X	X	
Orchardgrass & Ladino Clover	6 – 8 ½ - 1			X	X	
Birdsfoot Trefoil 1/ & Kentucky Bluegrass	6 2			X	X	
Reed Canarygrass & Ladino Clover	10 ½ - 1			X	X	

2/ These mixtures primarily adapted to northern Ohio.

SITE ADAPTATION

Seeding Mixtures	Rate Lbs./Acre		Well Drained Low-Medium Productivity Nearly Level To Steep, Stony or Steep & Very Steep Slopes P&H Suit. Group – A3, A4, B2, E2, F2, F4, F6, G2	Well Drained High Productivity P&H Suit. Group - A1, A2	Well and Moderately Well Drained Low-Medium Productivity Nearly Level to Moderately Steep P&H Suit. Group – B1, B4 E1, E3, F1, F3, F5, G1	I
Switchgrass	6 (PLS)			X	X	
Indiangrass	10 (PLS)		X	X	X	
Big Bluestem	10 (PLS)		X	X	X	
White or Yellow Sweet Clover & Ladino Clover & Timothy & Smooth Bromegrass Or Orchardgrass	10 ½ 2 – 4 6 4		X	X	X	

Conservation practice standards are reviewed periodically, and updated as needed. To obtain the current version of this standard, contact the Natu
Service office or web site (www.oh.nrcs.usda.gov).

APPENDIX II

II. Lime and Fertilizer

Correct or maintain a soil pH of 6.0 to 6.5 for grasses or 6.5 to 7.0 for legumes or grass-legume mixtures.

For pasture and hayland raise soil test levels of phosphorus to at least 60 (Bray P^1) and exchangeable potassium to at least 260 plus 5 times the cation exchange capacity (CEC) of the soil. If soil test levels are below 90 for phosphorus and 400 for potassium, an additional 40 pounds of phosphate (P_2O_5) and 40 pounds of potash (K_2O) will be applied as a starter. No additional phosphorus or potassium should be applied as a starter. No additional phosphorus or potassium should be applied if tests are above these levels. In addition, apply 10 pounds of nitrogen on legumes, 20 pounds on grass-legume mixtures and 30 pounds on cool season grasses or grass-ladino clover mixtures at seeding time. Use no nitrogen at seeding time on warm season grasses.

For land in the CRP program to be seeded to permanent vegetative cover, raise the soil test levels to at least a Bray P^1 of 30 and exchangeable potassium of at least 220. Starter fertilizer recommendations for nitrogen, phosphorus and potassium as discussed for pasture and hayland, shall also be used for CRP seedings.

On the average, it requires 10 lbs./acre of (P_2O_5) fertilizer to increase the P soil test value one unit. Similarly, it requires 2.5-lbs. acre of (K_2O) fertilizer to raise the soil test K value one unit.

III. See Section II-K for site adaptation of species and Pasture and Hayland Suitability Group (P&HSG). Select a suitable seed mixture and rate from the enclosed seeding chart.

IV. Seeding Dates

Seedings must be strong enough to survive a stress period, which may occur, following seeding. Avoid the hot, dry stress conditions of late June and July or the hard freezes of mid to late fall by seeding during the following seeding periods:

		Northern Ohio	Southern Ohio
	Frost Seedings	Late Winter to Mar. 15	Late Winter to March 1
Legumes & Cool	Spring	April 1 to May 10	Mar. 15 to April 30
Season Grasses 1/	Late Summer	Aug. 1 to Aug. 30	Aug. 1 to Sept. 15
Warm Season	Late Spring	April 15 to June 1	April 1 to June 1
Grasses	Dormant	Nov. 15 to Early Spring	Nov. 30 to Early Spring

1/ When timothy is included in a mixture to be seeded in fall seeded small grains, the timothy should be seeded at the time the grain is seeded. The other grasses and legumes should be seeded in early spring.

APPENDIX II

V. Seed Quality

All seed will be of good quality and comply with state seed laws.

Legumes shall be inoculated before seeding with the specific type of inoculant for the species. If the seed was preinoculated more than sixty (60) days prior to seeding, it shall be reinoculated.

VI. Seedbed Preparation and Seeding

A. Complete Renovation

1. Where the potential for erosion is a concern, the seedbed may be prepared by moldboard plowing and secondary tillage to make a firm seedbed.

2. Where erosion is a concern; a) Prepare the seedbed with a disk or chisel plow that leaves existing vegetation on the soil surface as a mulch. Begin tillage operations far enough in advance to completely kill the vegetation. b) Kill existing vegetation with herbicides as labeled and make a no-till seeding.

3. Seedbed preparation and seeding operations will be done on the contour or across the general slope on fields with 5 percent or steeper slopes.

4. Place seed ¼ to ½ inch deep by using a grassland drill, grain drill with press wheels, cultipacker seeder, or by broadcasting the cultipacking or light harrowing before and after seeding.

5. For no-till seedings, graze or mow existing vegetation closely. Apply herbicides to kill or suppress existing vegetation and control weeds. Apply 2 4-D 10 to 14 days prior to applying contact herbicides. Apply all herbicides in the manner and at the rates recommended on the label and in the Ohio Agronomy Guide.

6. When seeding a small grain companion crop, the seeding rates should be no more than one (1) bushel of spring oats or 20 pounds of wheat or cereal rye per acre. Companion crops will be grazed or mowed in the dough or early head stage or harvested early for grain. Mow stubble low and remove it immediately after grain harvest.

7. Companion crops will not be used for spring seeded warm season grasses. Atrazine used according to label recommendations may be applied to Switchgrass and Big Bluestem to control competing weeds. Atrazine application should be delayed at least 48 hours after seeding switchgrass to avoid killing the seed prior to germination. Atrazine application may be delayed up to emergence on Big Bluestem. Heavy grass infested fields should be avoided when planting warm season grasses.

VI. Seedbed Preparation and Seeding

8. Dormant seedings of warm season grasses may be made into crop residues or grown mulch. The warm season grasses should be drilled through the ground cover when the soil temperature is 40^{o}F or less and before freezing. Normally, this period would be from November 15 through December 30.

Procedures for Various Ground Covers:

a. Crop Residue – Drill grasses into evenly distributed soybean or small grain residues. Shred and evenly distribute corn and other residues over the surface and drill.

b. Grown Mulch – Prepare a clean seedbed and seed two (2) bushels of sprig oats and 20-30 pounds of wheat or cereal rye per acre during August to mid-September. Broadcast or drill the warm season grass into the standing cover crop in late November through December. The oats will winterkill and provide mulch. Mow the wheat or rye in the early head stage to prevent competition.

9. Mow only to control weeds and mow above seedling height.

B. Incorporating or Re-establishing Legumes into Existing Grass Stands

1. Mow fields closely to weaken stand.

2. Use a disk, field cultivator, or similar tool to disturb or destroy 50 to 60 percent of existing stand in late fall, early winter, or spring.

3. When tillage is done in fall or winter, broadcast seed in late February or early March.

4. When spring seeding is done, plant seed ¼ to ½ inch deep by using a grain drill with press wheels, cultipacker seeder, or by broadcasting and harrowing or cultipacking after seeding.

5. No-till seeding may be done within late summer or spring seeding dates with the use of appropriate herbicides as labeled.

6. Species and rates – use one of the following species and rates of seeding when incorporating legumes into an existing grass stand. Refer to the Ohio Agronomy Guide for adapted varieties of these legumes.

Alfalfa	8 pounds per acre
Alfalfa Red Clover	5 pounds per acre 3 pounds per acre
Birdsfoot Trefoil	4 pounds per acre
Red Clover	6 pounds per acre
Ladino Clover	½ pound per acre

7. When grass is 6-8 inches tall in the spring, graze or slip to reduce the competition with the legumes. If grazing is used, remove livestock when they begin grazing the legumes.

VII. Cover Management for Stand Maintenance and Wildlife Benefits on CRP Land.

1. Mowing.

a. Mowing may be done to control weeds anytime during the seedling year. Mow high to prevent damage to the permanent seedings. Warm season grasses should not be mowed closer than six inches.

b. After the seedling year, spot mowing or spot chemical treatment to control noxious weeds should be done rather than mowing the entire field.

c. Annual mowing should be discouraged, since it greatly reduces residual cover for next year's nesting. Periodic mowing (once every 3-5 years) will be beneficial since it will help prevent a "sod-bound" condition, which is detrimental to the stand as well as to wildlife nesting value, and will control woody vegetation.

d. Any mowing (after the seedling year) shall be done after August 15, to protect nesting birds.